Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:
LiDAR Elevation Data Collection - Putnam County, NY, 2008 (NYSDEC)

1.2. Summary description of the data:
Summary of the surface elevation data collection project in Putnam County, NY (NYSDEC) 2008. Products generated include LiDAR point data in LAS Binary format v1.1. In the spring of 2008, The Sanborn Map Company, Inc. (Sanborn) acquired 111 square miles of terrestrial LiDAR data in Putnam County, NY. An Optech ALTM 2050 Airborne LiDAR sensor was used for the collection. The LiDAR data associated with this metadata file is in LAS binary format, version 1.1 (ASPRS specification, see Cross References).

1.3. Is this a one-time data collection, or an ongoing series of measurements?
One-time data collection

1.4. Actual or planned temporal coverage of the data:
2008-04-02 to 2008-04-08

1.5. Actual or planned geographic coverage of the data:
W: -76.337171, E: -75.754295, N: 42.849255, S: 42.29604

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
las

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
NOAA Office for Coastal Management (NOAA/OCM)

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:
NOAA Office for Coastal Management (NOAA/OCM)

2.4. E-mail address:
coastal.info@noaa.gov

2.5. Phone number:
(843) 740-1202

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5. Data Lineage and Quality
NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible
(describe or provide URL of description):
Process Steps:
- 2008-01-01 00:00:00 - Data collection: Using Sanborn's Optech ALTM 2050 (SN# 02D140) Light Detection And Ranging (LiDAR) system, 18 flight lines of standard density (1.4 meter ground sample distance) data were collected over areas in

Putnam County, NY (approximately 111 square miles). Two returns were recorded for each laser pulse along with an intensity value for each return. The data acquisition occurred in 5 missions between April 02, 2008 , and April 08, 2008. During the LiDAR campaign, the Sanborn field crew conducted a GPS field survey to establish final coordinates of the ground control stations for final processing of the base-remote GPS solutions.
- 2008-01-01 00:00:00 - Airborne GPS processing: Airborne GPS data was differentially processed and integrated with the post processed IMU data to derive a smoothed best estimate of trajectory (SBET). The SBET was used to reduce the LiDAR slant range measurements to a raw georeferenced point. Airborne GPS is differentially processed using the GrafNAV v7.50 software by Waypoint Consulting of Calgary, Alberta, Canada. The georeferenced point cloud was generated in REALM v3.5.4 software by Optech Inc., of Vaughan, Ontario, Canada.
- 2008-01-01 00:00:00 - IMU data processing: IMU data provides information concerning roll, pitch and yaw of collection platform during collection event. IMU information allows the pulse vector to be properly placed in 3D space allowing the distance from the aircraft reference point to be properly positioned on the elevation model surface. IMU data is processed using the POSPac v4.2 software by Applanix Corporation of Richmond Hill, Ontario, Canada.
- 2008-01-01 00:00:00 - LiDAR point classification First data in areas of overlapping scans is classified to separate overlap points into a separate class; this results in a more uniform point density in the point cloud from which the ground points will be extracted. This 'cut-overlap' process is performed with the aid of the aircraft trajectory (reduced to the sensor's trajectory) and the scan angle value within the LAS data. For this project, the value used for cutting the overlap was 25 degrees. This means that data from a single scan greater than 12.5 degrees off nadir gets classified to class 12, Overlap. Using the trajectory and embedded angle information, the software is able to properly reclassify the overlap points so that the remaining point cloud is edge-matched, i.e. there are no data voids within the point cloud with class 12 overlap points turned off. Then comes the bare earth extraction from the rest of the point cloud. The extraction is the result of a morphological processing routine run in TerraScan: a set of user-defined distances and angles are used by the software to build an initial ground surface from established 'aerial low seed points'; iterative application of filters populates further the 'Bare Earth Point' class (Classification value 2) with those adjoining points judged not to be above-ground objects. The rest of the points stays in the Classification value 1, Unclassified Point class. The classification algorithms used on the LiDAR point cloud involved several iterative steps including the removal of low points and other outlyers, the culling of overlap data, and finally the classification of the LiDAR Bare Earth Points. This process begins with automated routines and ends with a 100% manual edit and QC check of the data. Once the data set classification accuracy was deemed sufficient and no quality issues were found, a final vertical accuracy assessment was performed on the bare-ground class of the LiDAR. The classification and quality control (QC) of LiDAR data is carried out using

TerraScan software v. 8.003 by Terrasolid Limited of Helinski, Finland.
- 2008-01-01 00:00:00 - Output LAS files The tiling and final LAS file creation was performed using LiDAR CuePac v5.0 from GeoCue Corporation of Madison, Alabama, USA. By client specification, the LiDAR point cloud data were cut to 750 x 750 meter tiles (0.56 sq km, 0.2 sq mi) tiles. The naming convention used for the tiles is based on the truncated grid coordinate at the point of origin of the tile, the Southwestern (lower left) corner, with an "u_" prefix.
- 2008-01-01 00:00:00 - Data Validation: The final LiDAR LAS 1.1 was created in UTM Zone 18 North, referenced to NAD83 and NAVD 88, in meters. The final LiDAR DEM was verified against FEMA checkpoints in order to perform a redundancy check against the GPS solutions. These accuracy checks also verified that the data meets the guidelines outlined in FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners and Appendix 4B, Airborne Light Detection and Ranging Systems.
- 2008-01-01 00:00:00 - LiDAR Network Overview: NYS CSCIC contracted with Sanborn for the collection and production of LiDAR data over New York's Putnam County. In response, Sanborn acquired the data in the Spring of 2008. Three dual-frequency GPS (Global Positioning System) units were used in this project; two on the ground operating over control stations and one on the aircraft. All three units operated concurrently during the LiDAR acquisition capturing raw positional information at an epoch rate of 1 second. The raw GPS data was differentially corrected using post-production kinematic GPS processing software to provide refined GPS solutions for proper georeferencing of the aircraft and LiDAR system. During the LiDAR acquisitions the GPS base stations were set up over National Geodetic Survey (NGS) control stations ARP (PID LX1523) located at the Dutchess County Airport and Fahnestock (PID AB3872) located southeast of Beacon, New York. A ground control network was surveyed including 2 horizontal 0 order NGS stations: ARP (PID LX1523) and Fahnestock (PID AB3872), as well as 2 vertical First order NGS stations: 851 8924 D TIDAL (PID LX1848), and 851 8924 C TIDAL (PID LX1849). A minimally and fully constrained network adjustment was performed on these stations and the resulting final adjusted coordinates were used to post-process the airborne GPS and IMU data. The source information on the NGS control stations can be found by entering the PID information on the NGS website (http://www.ngs.noaa.gov/cgi-bin/ds_pid.prl). A second network adjustment was performed after it was discovered the wrong control stations were constrained during the first adjustment. For the second network adjustment, station Fahnestock was constrained horizontally, station ARP was constrained both horizontally and vertically, and station 851 8924 D TIDAL was constrained vertically. The second adjustment yielded coordinates that differed from the first adjustment coordinates primarily in the vertical component. By the time the second network adjustment was computed, the LiDAR post-production process had advanced significantly and the LAS binary data was already tiled and classified in the final coordinate system. The solution to this problem was to derive a set of 3-D transformation parameters going from the first adjusted coordinates to the second adjusted coordinates. The transformation parameters were then applied to the tiled LAS data on a point by

point basis. The process to derive the transformation parameters was as follows: The four first and second adjustment geographic coordinates were converted to UTM grid coordinates using CORPSCON v.6.0. The vertical input was referenced to GRS 80 and the vertical output was referenced to NAVD88 using Geoid03. Next, these two sets of four grid coordinates were read into TerraScan's 'Derive Transformation' utility (version 8.003) which used a least squares adjustment to create a set of 3-D rotate and translate transformation parameters. The resultant parameters were then applied to the entire LAS point cloud using TerraScan's transformation routine. The largest magnitude of change in the transformation was in the vertical component with a change of -0.072 meters. A text document named "3D_Translate_Rotate_Transformation" details the transformation paramters and is on file at Sanborn, at NYSDEC and at NY CSCIC.
- 2008-12-01 00:00:00 - Independent Accuracy Assesment and Quality Asurance PUT HERE SUMMARY OF QA PROCESS
- 2009-08-05 00:00:00 - Dataset copied.
- 2015-03-10 00:00:00 - The NOAA Office for Coastal Management (OCM) received the files in laz format from USGS via an FTP online repository. The files contained lidar elevation and intensity measurements. The data were in State Plane Zone 2900, NAVD88 (orthometric) heights in feet. OCM performed the following processing for data storage and Digital Coast provisioning purposes: 1. The data were converted from UTM coordinates to geographic coordinates. 2. Erroneous elevations were removed. 3. Class 11 points were reclassed to class 15. 4. The data were converted from NAVD88 (orthometric) heights in feet to GRS80 (ellipsoid) heights in meters using Geoid 09. 5. The LAS data were sorted by latitude and the headers were updated.

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

No

6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:
- 1.7. Data collection method(s)
- 3.1. Responsible Party for Data Management

- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.1.2. If there are limitations to data access, describe how data are protected
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

6.2. Name of organization or facility providing metadata hosting:

NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:

https://www.fisheries.noaa.gov/inport/item/49886

6.4. Process for producing and maintaining metadata

(describe or provide URL of description):

Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access

NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:
NOAA Office for Coastal Management (NOAA/OCM)

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:
https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=4869
https://coast.noaa.gov/htdata/lidar1_z/geoid12a/data/4869

7.3. Data access methods or services offered:
This data can be obtained on-line at the following URL:

https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=4869

The data set is dynamically generated based on user-specified parameters.;

7.4. Approximate delay between data collection and dissemination:

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:
(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
Office for Coastal Management - Charleston, SC

8.3. Approximate delay between data collection and submission to an archive facility:

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?
Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.